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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,276	10/23/2003	Mustafa Pinarbasi	SJO920000063US2	2354

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INTERNATIONAL BUSINESS MACHINES CORPORATION
650 Harry Road, L2PA/J2C
INTELLECTUAL PROPERTY LAW
SAN JOSE, CA 95120-6099

EXAMINER

MCDONALD, RODNEY GLENN

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 02/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/693,276	Applicant(s) PINARBASI, MUSTAFA	
	Examiner Rodney G. McDonald	Art Unit 1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Allowable Subject Matter

The indicated allowability of claims 2-5 is withdrawn in view of the newly discovered reference(s) to Sakakima et al. (U.S. Pat. 6,567,246) and Sato et al. (U.S. Pat. 5,986,858). Rejections based on the newly cited reference(s) follow.

Double Patenting

Claim 10 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 3. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim 11 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 6. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim 12 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 7. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 6, 8, 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Sakakima et al. (U.S. Pat. 6,567,246).

Regarding claim 1, Sakakima et al. teach a method of making a magnetoresistance effect element having a spin valve. (See Figs. 1-13) Sakakima et al. teach in Fig. 11A a substrate 1 having a deposited thereon a first ferromagnetic layer 32 of CoFe having a first surface, forming an oxidized CoFeO layer 31, forming a ferromagnetic layer of CoFe, depositing a spacer layer 4 of Cu having a second surface and a second ferromagnetic layer 5 of Ni Fe. (See Fig. 11A; Column 24 lines 54-57; Example 2) The layers containing no oxygen can be produced by sputtering and the oxidized magnetic film layer can be produced by oxidizing the surface of the magnetic film 32. (Column 24 lines 25-27; Column 22 lines 19-26) The method for producing the oxide magnetic film can include plasma oxidation, natural oxidation and using a radical or ion gun. In plasma oxidation Rf or DC potential is applied between a surface of a metal film and an electrode to generate plasma between while flowing oxygen gas into the chamber. The plasma oxidizes the surface of the metal film. (Column 13 lines 5-

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18) Preferably, oxygen gas having a pressure equal to atmospheric pressure or less is introduced into a chamber to oxidize the surface of the metal film. (Column 13 lines 19-23) Sputtering is used to produce a ferromagnetic layer 32 of CoFe in an Argon gas at a pressure of 0.8 mTorr. In an oxidizing step sputtering is stopped and oxygen is introduced so that the gas is 1/8 of oxygen and oxidation of the first surface of the magnetic layer can take place to produce a surface oxide layer of CoFeO. (Column 22 lines 1-26) Sputtering of the nonmagnetic layer can use only argon and this shows that the oxygen partial pressure is stopped (i.e. decreased) and sputtering of the subsequent layer (i.e. Cu) takes place in Argon gas. (Column 19 lines 54-57) It should be noted that a Cu layer would inherently be sputtered without oxygen present to produce a Cu layer.

Regarding claims 6, 11, the layers can be produce by ion beam sputtering.
(Column 14 lines 24-26)

Regarding claim 8, Sputtering is used to produce a ferromagnetic layer 32 of CoFe in an Argon gas at a pressure of 0.8 mTorr. In an oxidizing step sputtering is stopped and oxygen is introduced so that the gas is 1/8 of oxygen and oxidation of the first surface of the magnetic layer can take place to produce a surface oxide layer of CoFeO. (Column 22 lines 1-26) Sputtering of the nonmagnetic layer can use only argon and this shows that the oxygen partial pressure is stopped (i.e. decreased) and sputtering of the subsequent layer (i.e. Cu) takes place in Argon gas. (Column 19 lines 54-57) It should be noted that a Cu layer would inherently be sputtered without oxygen present to produce a Cu layer.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakakima et al. (U.S. Pat. 6,567,246).

Sakakima et al. is discussed above and all is as applies above. (See Sakakima et al. discussed above)

The difference not yet discussed is the partial pressure of the oxygen when exposing one or more of the first and second surfaces to oxygen is not discussed. (Here the Examiner interprets "one or more of the first and second surfaces" as "exposing the first surface" (i.e. exposing one of the first surface).)

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Regarding the partial pressure of oxygen, Sakakima et al. teach that the oxygen gas should have a pressure of atmospheric or below when oxidizing the surface.

(Column 13 lines 21-22) This shows applicant's required pressure range.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Sakakima et al. by utilizing particular pressures because it allows for producing a magnetoresistance effect element which is easily rotated in a magnetic field.

Claims 2, 3, 4, 5, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakakima et al. in view of Sato et al. (U.S. Pat. 5,986,858).

Sakakima et al. is discussed above and all is as applies above. (See Sakakima et al. discussed above)

The differences not yet discussed is wherein the oxygen partial pressure decreases below an oxygen partial pressure level used in exposing the first and second surfaces before the deposition of the spacer layer and the second ferromagnetic layer (Claims 3, 10), exposing the first surface to the oxygen partial before depositing the spacer layer (Claims 4, 9), and exposing the second surface to the oxygen partial pressure before depositing the second ferromagnetic layer (Claims 5, 9).

Regarding claims 3-5, 9 and 10, Sakakima et al. discussed above teach depositing a ferromagnetic layer in Ar. Stopping sputtering and admitting oxygen and oxidizing the surface of the ferromagnetic layer. Stopping the oxygen (i.e. this is the decreasing of oxygen below an oxygen partial pressure when exposing the first surface) and sputtering the Cu spacer layer in argon. (See Sakakima et al. discussed above)

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Sato et al. teach that the spacer layer of aluminum can be sputtered and then be oxidized. A subsequent ferromagnetic layer can be sputter deposited thereon. (i.e. this is the decreasing of oxygen below an oxygen partial pressure when exposing the second surface because the subsequent ferromagnetic layer is sputtered in an argon atmosphere.) (See Fig. 15; Column 14 lines 23-34)

The motivation for oxidizing the ferromagnetic layer and the spacer layer is that it allows for producing a magnetic element that has little degradation in performance. (Column 6 lines 51-55)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Sakakima et al. by utilizing an oxidized spacer layer and to have controlled the various partial pressures of oxygen when forming the magnetic element as taught by the combination of Sakakima et al. and Sato et al. because it allows production of magnetic element that has little degradation in performance.

Claim 7 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakakima et al. as applied to claim 1 above, and further in view of Pinarbasi (U.S. Pat. 5,871,622).

The difference not yet discussed is the use of a shutter (Claims 7 and 12)

Regarding claims 7 and 12, Sakakima et al. teach that the layers can be ion beam sputtering. (See Sakakima et al. discussed above) Pinarbasi teach in Fig. 1 an ion beam sputtering device having a shutter 106. (See Fig. 1) Having the shutter 106

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open to expose the substrate would be obvious since Sakakima et al. require that the entire surface be oxidized.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Sakakima et al. by utilizing a shutter in an ion beam device as taught by Pinarbasi because it allows for oxidizing the entire surface.

Response to Arguments

Applicant's arguments filed 11-23-05 have been fully considered.

Applicant's arguments have been considered but newly cited reference to Sakakima et al. teach oxidizing an upper surface of a ferromagnetic layer which can be considered a first surface with respect to the claims.

This action will be made NON-Final based on the newly cited references.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M- Th with Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rodney G. McDonald
Primary Examiner
Art Unit 1753

RM
January 25, 2006